Light Vehicle Diesel Engines 1st edition Wright Test Bank

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Name:_____ Class:_____ Date:_____

Chapter 02 Test

Indicate the answer choice that best completes the statement or answers the question.

1. After which 20th Century event did the thriftier diesel become regarded as a potential replacement for gasoline engines?
   a. 1970: oil crisis in North America
   b. 1960s: creation of OPEC
   c. 1930s: development of compact fuel-injection equipment
   d. 2008: financial crisis in North America

2. When did Rudolph Diesel (1858–1913) patent his engine?
   a. 1899
   b. 1892
   c. 1900
   d. 1883

3. Technician A says that diesel engines inject liquid fuel under high pressure into the combustion chamber near the end of the intake stroke. Technician B says that air that is heated during the compression stroke becomes the ignition source. Who is right?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

4. Inspiration for the engine concept may have occurred when Rudolf Diesel observed a demonstration of a device used to:
   a. start fires
   b. start steam engines
   c. increase pressure
   d. increase power

5. Which one of the following negative characteristics did NOT hinder the more widespread use of diesels?
   a. Noisy engine operation
   b. Poor hot weather start ability
   c. Poor acceleration
   d. Strong exhaust odor

6. At what level of efficiency did Rudolf Diesel's slow-rotating engine operate?
   a. 25%
   b. 50%
   c. 75%
   d. 100%

7. In 1929, Clessie Cummins, founder of Cummins Engine Company, built North America's first diesel-powered:
   a. car
   b. truck
   c. boat

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d. tractor

8. Not only are diesel emissions as clean as gasoline engine mandated for 2017, but they also emit a minimum of _____ fewer exhaust emissions.
a. 10–30%
b. 15–35%
c. 20–40%
d. 40–60%

9. Typically, diesel engines will achieve between _____ better fuel economy in comparison to similar gasoline engines.
a. 15% and 40%
b. 25% and 70%
c. 25% and 60%
d. 45% and 90%

10. The diesel engine produces significantly higher _____ compared to similarly displaced gasoline-fueled engines.
a. horsepower
b. torque
c. emissions
d. speed

11. In comparison to electric vehicles, a recent study by Energy and Environment Study Institute determined the battery electric models offered for sale in the US have an average base price of $63,000 and an average driving range of:
a. 111 miles
b. 211 miles
c. 311 miles
d. 411 miles

12. What are the CO_2 emissions for a diesel engine?
a. 22.2 lb per gallon of fuel
b. 6.2 lb per gallon of fuel
c. 6.1 lb per gallon of fuel
d. 20.2 lb per gallon of fuel

13. Technician A says that some studies suggest that electric vehicles may in fact be dirtier than diesel engines due to battery manufacturing. Technician B says that after including emissions from lithium-ion battery, electric vehicles generate half the emissions of a traditional internal combustion engine. Who is right?
a. A only
b. B only
c. Both A and B
d. Neither A nor B

14. Technician A says that a diesel engine's higher compression ratio helps it to produce more power and use less fuel. Technician B says that higher compression ratios only help the diesel engine produce more torque. Who is correct?
a. Technician A

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b. Technician B
c. Both A and B
d. Neither A nor B

15. Until the development of antiknock additives for gasoline, such as tetraethyl lead in the late 1920s, compression of an air and fuel mixture was limited to the ratio:
a. 4:1
b. 5:1
c. 6:1
d. 10:1

16. While diesel engines do not have compression limits to combustion, compression ratios above what ratio provide minimal power increases?
a. 12:1
b. 14:1
c. 15:1
d. 16:1

17. Engine efficiency drops after a compression ratio of:
a. 21:1
b. 23:1
c. 25:1
d. 27:1

18. Compression pressures produce an average pre-ignition temperature of:
a. 1,000°F
b. 2,000°F
c. 3,000°F
d. 4,000°F

19. Which of the following is NOT provided by a higher compression ratio?
a. Higher expansion ratios
b. Improved combustion
c. Better air-fuel mixture
d. Lower expansion ratios

20. Smaller four-stroke diesels require a minimum cranking speed of _____ rpm to start.
a. 150
b. 180
c. 125
d. 135

21. Technician A says that technological developments now enable the injection of gasoline directly into the combustion chamber of spark-ignited gasoline engines. Technician B says that gasoline direct-injection (GDI) engines inject gasoline near the beginning of the compression stroke. Who is right?

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a. A only
b. B only
c. Both A and B
d. Neither A nor B

22. There are _____ basic combustion chamber diesel engine designs but numerous variations on both.
a. 1
b. 2
c. 3
d. 4

23. Which one of the following is NOT a reason for the IDI chamber being the most popular design in automotive applications in the early 1990s?
a. High-speed capabilities
b. Favorable emissions characteristics
c. Inexpensive fuel-injection systems
d. 10–15% greater fuel efficiency

24. DI chambers generally require no:
a. EGR valves
b. particulate filters
c. oxidation catalysts
d. starting aids

25. Technician A says that without adequate turbulence, air and fuel will not mix, resulting in lost performance and efficiency and in increased emissions. Technician B says that the semi-toroidal shape of the DI chamber is designed to mix the air and fuel. Who is right?
a. A only
b. B only
c. Both A and B
d. Neither A nor B

26. Which one of the following conditions will be produced by prolonged ignition delay in a diesel engine?
a. An engine knocking sound.
b. Blue smoke.
c. White smoke.
d. Lower peak cylinder pressures.

27. Which of the following best describes the term “ignition delay”?
a. The time required to raise the fuel pressure high enough to overcome compression pressure in a cylinder.
b. The time lag from initial injection to actual ignition.
c. The time required to heat up a glow plug.
d. The time required for vaporized fuel to atomize.

28. Technician A says that diesel engines supply only enough air to completely burn all the fuel in the combustion

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chamber. Technician B says that diesel engines supply excess air to the combustion chamber to completely burn all the fuel in the combustion chamber. Who is correct?

a. Technician A
b. Technician B
c. Both A and B
d. Neither A nor B

29. Identify the points on the PV (pressure volume) graph between which uncontrolled burn period occurs.

a. A and B
b. B and C
c. C and D
d. D and E

30. Technician A says that injection quantities of fuel in a diesel engine at idle are very large. Technician B says that the cooling effect of excess air and prolonged idle has detrimental effects on the engine. Who is right?

a. A only
b. B only
c. Both A and B
d. Neither A nor B

31. Technician A says that small quantities of diesel fuel are adequate to create enough cylinder pressure to rotate the crankshaft but produce very little heat. Technician B says that less air in diesels dilutes the heat of combustion and lowers average cylinder temperatures. Who is right?

a. A only
b. B only
c. Both A and B
d. Neither A nor B

32. Which of these causes more heat retention by the engine around the exhaust ports, thus transferring more heat to the cooling system?

a. Exhaust backpressure
b. Lower temperature thermostat
c. Higher temperature thermostat
d. EGR valve

33. What creates low exhaust temperatures and low cylinder temperatures, which have adverse consequences on engine life and operation?

a. High thermostat
b. Excess air
c. Excess fuel
d. Exhaust backpressure

34. Two technicians are discussing combustion slobber. Technician A says that low piston temperatures also mean the piston has not fully expanded and will easily allow lube oil into the combustion chamber. Technician B says that the black gooey liquid that leaks from exhaust manifold joints and the exhaust pipes when engines are excessively idled is called sludge. Who is right?

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a. A only
b. B only
c. Both A and B
d. Neither A nor B

35. The IDI combustion system uses fuel injected into a smaller, spherical, highly turbulent chamber that is connected to a main chamber through a narrow passageway called a(n):
a. venturi
b. orifice
c. nozzle
d. port

36. Which of the following is NOT a major characteristic of the IDI chamber?
a. Uses pre-combustion chamber formed in the cylinder head
b. IDI injectors use pintle-type nozzles
c. Uses a Mexican hat piston
d. Chamber typically holds approximately 70% of the cylinder volume

37. What happens to the coarse fuel droplets when fuel initially contacts the incandescent glow plug during start-up and then on the hot walls of the pre-chamber during regular operation?
a. They vaporize
b. They atomize
c. They get mixed
d. They boil

38. IDIs are capable of a faster top engine rpm limit due to a higher degree of _____ to produce more rapid and even mixing of air and fuel.
a. fuel pressure
b. heat
c. turbulence
d. compression

39. Once the engine is operational, the controller will cycle the plugs on and off during the _____ period.
a. afterglow
b. pre-glow
c. heating
d. warm-up

40. Which diesel engine combustion chamber design will produce the fastest coolant warm-up times?
a. Direct injection.
b. Indirect injection.
c. Two stroke.
d. Hemispheric chamber.

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Answer Key

1. a

2. b

3. b

4. a

5. b

6. c

7. a

8. c

9. c

10. b

11. b

12. a

13. c

14. a

15. a

16. d

17. b

18. a

19. d

20. c

21. a

22. b

23. d

24. d

25. c

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26. a

27. b

28. b

29. b

30. b

31. a

32. a

33. b

34. a

35. a

36. c

37. a

38. c

39. a

40. b

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